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STATE DOCUMENTS

# LIVESTOCK AND VEHICULAR UNDERPASSES IN USE

LIVESTOCK AND VEHICULAR UNDERPASSES IN USE --photographic illustrations



PHOTOGRAPHIC ILLUSTRATIONS

BY

RIGHT-OF-WAY SECTION

STATE OF MONTANA - DEPARTMENT OF HIGHWAYS

MONTANA STATE LIBRARY  
930 East Lyndale Avenue  
Helena, Montana 59601



## LIVESTOCK AND VEHICULAR UNDERPASSES IN USE

The primary objective of this report is to show the various sizes and shapes of underpasses in use as well as to show the size relationship to livestock and machinery. These are typical of underpasses in use and do not represent a complete inventory of sizes constructed on all road systems.

There has long been a need for visual aid in this area of right of way. In addition, our recent research report on Livestock and Vehicular Underpasses explored enough everyday problems to see the need for this type of thing.

It can be an invaluable tool for the negotiator, attorney, appraiser, or any right of way personnel having contact with a property owner affected by highway severance. This project was conceived as a result of years of ambiguities and unsupported statements about cattle and their use of underpasses, necessary vehicle clearance, and what these objects looked like in various shaped underpasses.

This project was initiated at State level and was not a Federally funded project. I personally feel that our highway organization showed great foresight in implementing this project. We now have, at our fingertips, a variety of reference material on a subject little explored. I am sure anyone who has worked with the thorny problem of rural highway underpasses has felt an underlying need for research and documentation on usage or non-usage of various types and sizes.

Details to watch for are types of wing fencing, vehicular clearance, roadbed material and width, cattle trailing patterns, structural details of the corrugated metal pipe, such as bolt ends, vehicular and underpass dimensions. Each photo page contains sufficient information to identify it and special features. On the average, I do feel the photographs represent what we set out to accomplish.



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<http://archive.org/details/livestockvehicul10mont>



During our photography of these herd and vehicle movements into and through these underpasses, we also had available a Super 8MM movie camera. With this, we took approximately twenty minutes of film with an accompanying Stenorette narrative, covering three livestock herd movements through underpasses and two vehicular underpasses in use. These are available upon request, although we have only a single copy. This film was produced on a very small scale, and showing to small audiences or individuals would probably produce best results.

This project was organized under the able supervision of R. E. Champion, the Supervisor of the Right of Way Section. It was started August 18, 1971, with field work to be finished by December 31. This allowed us to take advantage of autumn and early winter herd movements without expense to the rancher. The ranchers were cooperative, and with notice, we were able to be at the right place at the right time. This was often only on short notice, requiring the Research Unit to be ready to travel. This was primarily due to weather or other unpredictable conditions and the rancher himself could not plan that far ahead of time. At any rate, we do appreciate the response to the initial contact and follow-up chances to photograph the underpass in use.

A. A. JONES  
Research Coordinator  
Right of Way Section



# INDEX

<u>Size</u>	<u>Name</u>	<u>Page Nos.</u>
4's x 6'r x 35'L	Ralph Brown	1-4
Type 'A', 5'10''s x 6'6''r x 76'L	Steve Bodner	5-9
Type 'B', 5'10''s x 7'7''r x 88'L	Vernon Gliko	10-14
No. 99, 6'11''s x 8'6''r x 262'L	LaVon Mills	15-20
108" diameter x 260' L	Edgar Brown	21-23
120" diameter x 100' L	Jay Huller	24-26
No. 129, 10'10 $\frac{1}{2}$ ''s x 9'11''r x 100'L	-----	27
12'8''s x 8'7''r x 90'L	Richard Gosman Herd, Public Underpass	28-29
156" diameter x 154' L	Kenneth Vandolah	30-32
162" diameter x 150' L	Dan Deveney	33
No. 180, 15'6''s x 13'10''r x 154' L	Hilger Herd, Hilger & Sieben Underpass	34-38
180" diameter x 200' L	Ray Buehler Herd, Public Underpass	39-42
Same Pipe	Vern Stanford Herd, Public Underpass	43-46
210" diameter x 200' L	Pierce Ranches	47-51
14'6''w x 11'h x 120' L	County Road	52-56
20'5''s x 13'0''r x 210' L	Mike Oblander	57-59





DATE OF PHOTO  
October 21, 1971

West Entrance



4's x 6'r x 35' long, Concrete Arch S.P., Std. Drg. 63-01. Two miles south of Whitehall. Holstein, Guernsey, Dutch Belton dairy cows, totaling 34 head. Herd was moved to east of highway and back again.



East Exit

West Exit



4's x 6'r x 35' long, Concrete Arch S.P., Std. Drg. 63-01. Two miles south of Whitehall. Holstein, Guernsey, Dutch Belton dairy cows, totaling 34 head. Cattle did not hesitate except when cameraman stood in front over entrance.



DATE OF PHOTO  
October 21, 1971

West Exit



4's x 6'r x 35' long, Concrete Arch S.P., Std. Drg. 63-01. Two miles south of Whitehall. Holstein, Guernsey, Dutch Belton dairy cows, totaling 34 head. Notice how the cattle watch the cameraman. They seem a bit uneasy around strangers.



East Exit

DATE OF PHOTO  
October 21, 1971

East Exit



4's x 6'r x 35' long, Concrete Arch S.P., Std. Drg. 63-01. Two miles south of Whitehall. Holstein, Guernsey, Dutch Belton dairy cows, totaling 34 head. Farmer used a Honda 50 motorcycle to herd them through and back again.

North Entrance



5'10"s x 6'6"r x 76' long, Arch C.M.P., Type 'A', Std. Drg. 59-02. About 4 miles east of Raynesford on 2-lane Highway #87. Herd movement of 250 head into corral and through stockpass. Time to move them across was about 30 minutes.



North Entrance - Photo from back of corral



DATE OF PHOTO  
October 6, 1971

North Holding Corral



5'10''s x 6'6''r x 76' long, Arch C.M.P., Type "A", Std. Drg. 59-02. Herd movement of 250 head into corral and through stockpass. Most of herd was in corral at time of this picture. Notice pole wing fencing. These cattle were reasonably familiar with this structure.



DATE OF PHOTO  
October 6, 1971

North Holding Corral



5'10''s x 6'6''r x 76' long, Arch C.M.P., Type "A", Std. Drg. 59-02. Herd movement of 250 head into corral and through stockpass. Notice wing fencing which seems to work quite well as a funneling technique. About 4 miles east of Raynesford on 2-lane U.S. #87. Once cattle were started through, there did not seem to be much balking or stopping. This underpass had good utility.

South Exit



5'10''s x 6'6''r x 76' long, Arch C.M.P., Type 'A', Std. Drg. 59-02. Horses did not hesitate to go through; gate was then opened for 250 head of cattle from north holding corral.



South Exit

South Exit



5'10"s x 6'6"r x 76' long, Arch C.M.P., Type "A", Std. Drg. 59-02. Herd of 250 head moving through to south pastures for further stock drive the following day. Total crossing time about 30 minutes. Poles are much easier on cattle in these tight situations than barbed wire.



Looking South-Southwest



DATE OF PHOTO  
October 4, 1971

East Entrance



5'10" x 7'7" x 88' long, Arch C.M.P., Type "B", Std. Drg. 59-02. No holding pens, gradual wing fencing into recessed (bottom) location. Cattle were a little hesitant when cameraman stood on the shoulder in front of them. About 3-3/4 miles southeast of Belt, near Armington Junction on U.S. #89.

DATE OF PHOTO  
October 4, 1971

East Entrance



5'10"s x 7'7"r x 88' long, Arch C.M.P., Type "B", Std. Drg. 59-02. No holding pens, gradual wing fencing into recessed (bottom) location. Cattle sluff dirt into bottom, filling east entrance in about 1' in two seasons' use. See Page 14 for cleaning procedure. This stockpass, in spite of this and early season drainage, has very high utility. Just south of the Armington Junction, 3-3/4 miles southeast of Belt on U.S. #89.

West Exit



5'10''s x 7'7''r x 88' long, Arch, C.M.P., Type 'B', Std. Drg. 59-02. Herd did not stop as long as cameraman gave them room enough to move. Movement was steady, about 20 minutes crossing time.



West Exit



DATE OF PHOTO  
October 4, 1971

West Exit, Looking From Shoulder



5'10" x 7'7" x 88' long, Arch C.M.P., Type "B", Std. Drg. 59-02. Steady herd movement across meadow to upper pastures. Notice wire tied to stockpass. These cattle were quite familiar with this stockpass; second season in use.



West Exit to Meadows

East Entrance



5'10"s x 7'7"r x 88' long, Arch C.M.P., Type "B", Std. Drg. 59-02. Highway employees are using a backhoe front-end loader to remove dirt filled in by herd movement into stockpass, at request of landowner.



East Entrance



DATE OF PHOTO  
October 21, 1971

South Entrance



6'11" x 8'6" x 262' long, Arch C.M.P., Design #99, old Std. Drg. 59-04. About 200 head mixed herd movement from south to north. These stock were reasonably familiar with this underpass and stock trail. Notice stock holding pen--no longer necessary says owner.



South Entrance

DATE OF PHOTO  
October 21, 1971

North Exit



6'11"s x 8'6"r x 262' long, Arch C.M.P., Design #99, old Std. Drg. 59-04. About 200 head herd movement from south to north and return. Rancher, two sons and daughter moved cattle. Three miles west of Whitehall near Pipestone Interchange. Less than one hour to move them through and back again.



North Exit



South Exit



6'11" x 8'6" x 262' long, Arch C.M.P., Design #99, old Std. Drgs. Herd of 200 head returning through pipe. This structure will handle three abreast. Notice there are no wires tied into structure. Cattle can climb up on wing wall, which can be injurious to cattle.



South Exit

DATE OF PHOTO  
October 21, 1971

South Exit



6'11"s x 8'6"r x 262' long, Arch C.M.P., Design #99, old Std. Drgs. Continuing photos of 200 head herd movement north to south. Fencing should not be above stockpass, but tied into it. However, this underpass has high utility for stock movement.



South Exit



DATE OF PHOTO  
September 24, 1971

South Exit



South Exit



6'11" s x 8'6" r x 262' long, Arch C.M.P. Twenty head of cattle coming in from summer pasture; free herd movement, no riders pushing them.



South Exit



South Exit

DATE OF PHOTO  
August 23, 1971

North End



6'11" x 8'6" x 262' long, Arch C.M.P., Design #99, old Std. Drgs. Landowner drives his jeep through underpass fairly often; rather close fit, however. Underpass will not accommodate a pickup.

DATE OF PHOTO  
September 9, 1971

West Exit



108" diameter x 260' long, C.M.P. Near Jefferson City, under 4-lane I-15.  
Seven head of Quarterhorses were herded through this pipe, no hesitation.



DATE OF PHOTO  
September 9, 1971

West Exit



108" diameter x 260' long, C.M.P. Near Jefferson City; continuing photos of seven head of Quarterhorses herded through. Horses seem to keep their heads down naturally in this size pipe.

DATE OF PHOTO  
September 9, 1971

West End



108" diameter x 260' long, C.M.P. Near Jefferson City; 7 head of Quarter-horses herded through, rider was photographed at both ends. He rides his horse through but keeps his head down. Good utility once the horses became used to it.



East End

DATE OF PHOTO  
September 2, 1971

South Entrance Looking North



120" diameter x 100' long, C.M.P. Eight miles west of Three Forks on old U.S. #10. Rack, 6' wide x 7' high, on 3/4-ton pickup; 8' of roadway. Good installation and utility for small vehicles and livestock.



DATE OF PHOTO  
September 2, 1971

South Entrance Looking North



120" diameter x 100' long, C.M.P. Eight miles west of Three Forks on old U.S. #10. Rack, 6' wide x 7' high, on 3/4-ton pickup; 8' of roadway. Pickup returning from north. Good utility for small vehicles and livestock.

DATE OF PHOTO  
September 2, 1971

North End



120" diameter x 100' long, C.M.P. Eight miles west of Three Forks on old U.S. #10. Landowner called three horses through the underpass. Cattle use it during movement to and from summer pastures.

DATE OF PHOTO  
September 13, 1971

South End



10'10 $\frac{1}{2}$ "s x 9'11"r x 100' long, Arch C.M.P., #129, old Std. Drgs. Two-lane U.S. #10 near Big Horn Interchange, Treasure County. Underpass is heavily silted in from drainage. It will barely accommodate 1 $\frac{1}{2}$ -ton grain truck (8'x 8').

North Entrance



12'8''s x 8'7''r x 90' long, Squash C.M.P. Three miles north of Monida Pass under I-15 two-lane. Herd movement of 250 head 20 miles to winter pastures. Pipe is in low spot allowing spring runoff to silt it in. For this reason, there is only about 6 $\frac{1}{2}$ ' of clearance. High utility in fall, not so good in spring.



North Entrance



East Exit



12'8" s x 8'7" r x 90' long, Squash C.M.P. Three miles north of Monida Pass under I-15 two-lane. Portion of trail herd shown in these two photos. Very good utility at this time of year for stock drives. Most of these cattle have been through here at least one or two times.



East Exit

DATE OF PHOTO  
September 24, 1971

West Exit



156" diameter x 154' long, C.M.P. Just south of junction of I-90 on Highway #287, a two-lane primary route. Thirty head of Hereford cows and some bulls. No surfacing on this pipe, which is also under 22' of fill. Cattle did not seem to hesitate as they started through.

DATE OF PHOTO  
September 24, 1971

West Exit



156" diameter x 154' long, C.M.P. Just south of junction of I-90 on Highway #287, a two-lane primary route. Thirty head of cows and some bulls. No surfacing on this pipe, however, cattle did not seem to hesitate. There was just enough dirt to provide a walkway.



West End



DATE OF PHOTO  
September 24, 1971

West Exit



156" diameter x 154' long, C.M.P. Just south of junction of I-90 on Highway #287, a two-lane primary route. Thirty head of cows and some bulls. No surfacing, and this is not normally used for vehicle traffic. A 7' wide x 7' high 3/4-ton pickup was placed in the pipe to show size proportions.



West End - Notice flow measuring device.

DATE OF PHOTO  
November 16, 1971

South End



162" diameter x 150' long, C.M.P., set in recessed area east of Hysham under 4-lane 1-94. One and one-half ton grain truck, 7' high x 8' wide; pickup follows.



North End - Low spot is wet and catches drainage.

DATE OF PHOTO  
September 1, 1971

East End of Underpass



15'6''s x 13'10''r x 154' long, Arch C.M.P., Design #180, old Std. Drgs. Seven miles north of Helena under 4-lane highway near Sieben Interchange. One and one-half ton truck with stock rack, 8' wide x 9' high. There is about 10' of roadway width. This is a very good vehicular underpass, also used by logging trucks.



DATE OF PHOTO  
September 1, 1971

East End of Underpass



15'6''s x 13'10''r x 154' long, Arch C.M.P., Design #180, old Std. Drgs. Seven miles north of Helena, under 4-lane highway near Sieben Interchange. One and one-half ton truck with stock rack, 8' wide x 9' high. There is about 10' of roadway width. This is a very good vehicular underpass, also used by logging trucks.

East Exit



15'6" x 13'10" x 154' long, Arch C.M.P., Design #180, old Std. Drgs. Located 7 miles north of Helena under 4-lane highway near Sieben Interchange. Fifty pair (cow with calf) were moved to winter pasture; no hesitation in or through the underpass. The cows (not the calves) had been through before.



East Exit: Notice wing fencing as per Std. Drg. 81-02

East Exit



15'6''s x 13'10''r x 154' long, Arch C.M.P., Design #180, old Std. Drgs. Located 7 miles north of Helena under 4-lane highway near Sieben Interchange. Fifty pair (cow with calf) moved to winter pasture, no hesitation in or through underpass. Three riders were moving the 100 head of cattle.



East Exit



15'6''s x 13'10''r x 154' long, Arch C.M.P., Design #180, old Std. Drgs. Located 7 miles north of Helena under 4-lane highway near Sieben Interchange. Fifty pair of Herefords moved to winter pasture, bunched up near gate. Note wing fencing as per Std. Drg. 81-02. The fence angle is about 135°, has reinforced corners and one reinforced section near the pipe. Ideal installation for any size underpass. This is also a very good underpass for cattle or sheep movement. A herd of 5,000 head of sheep are trailed through here once in the springtime.

West Entrance



180" diameter x 200' long, C.M.P. Three miles north of Lima under 4-lane I-15. Herd movement of 250 head; 3-4 drivers, with pickup and truck following. Cattle were hesitant at first, however, went right through in about 15 minutes.



West Entrance

DATE OF PHOTO  
October 25, 1971

West Entrance



180" diameter x 200' long C.M.P. Three miles north of Lima under 4-lane I-15. Herd movement of 250 head west to east, 3-4 drivers, followed by pickup and truck. Mixed Hereford and Angus, spring and fall calves, yearlings and two year olds.



West Entrance, end of trail herd



DATE OF PHOTO  
October 25, 1971

Looking East from West Entrance



180" diameter x 200' long, C.M.P. Three miles north of Lima under 4-lane I-15. Riders following end of 250 head herd movement. Underpass is on county frontage road, therefore, on public thoroughfare. It is a very usable underpass for cattle movement. Notice graveled roadway.

DATE OF PHOTO  
October 25, 1971

East Exit



180" diameter x 200' long, C.M.P., Std. Drg. 59-06. Three miles north of Lima under 4-lane I-15. Truck following end of 250 head herd movement; 8' wide x 10' high 2-ton stock truck. There is about 14' of roadway, leaving this underpass a little too full for optional machinery usage.

DATE OF PHOTO  
October 25, 1971

Looking South at Trail Herd



Herd drive of 400 head coming into 180" diameter x 200' C.M.P., traveling down frontage road. Mixed herd, Hereford-Angus, spring calves, yearlings, two-year olds and cows. Three miles north of Lima along I-15, 4-lane.



Looking North Toward Pipe

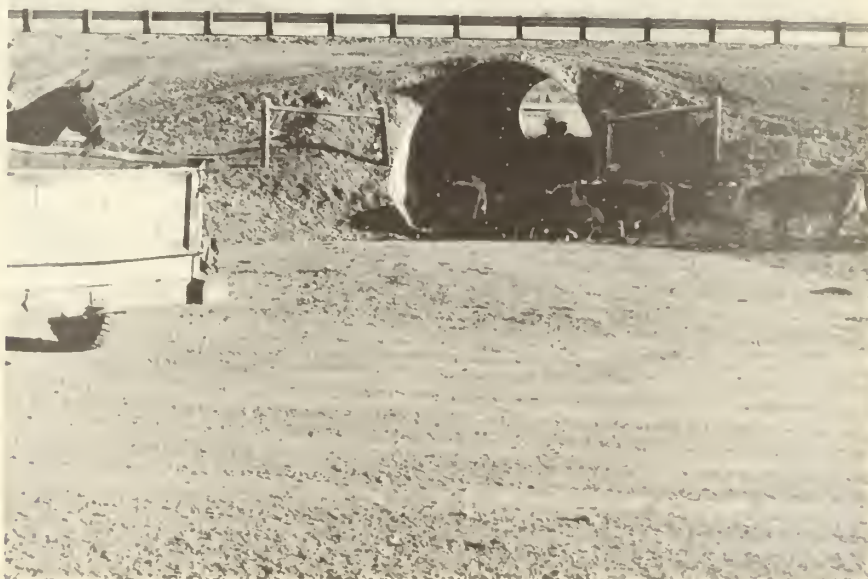


DATE OF PHOTO  
October 25, 1971

West Entrance From Frontage Road



180' diameter x 200' long, C.M.P., Std. Drg. 59-06. Three miles north of Lima under I-15, 4-lane. Herd movement of 400 head west to east, summer to winter pastures. Rather improper fencing due to frontage road. Cattle did not hesitate at going through structure and they had been through here only once. This was the first season in use.



Stock Beginning Through West Entrance

East Exit Onto Frontage Road



180" diameter x 200' long, C.M.P., Std. Drg. 59-06. Three miles north of Lima on 4-lane I-15. Herd movement of 400 head west to east. Mixed Hereford and Angus cows, two-year olds, yearlings and some springs calves. Cattle did not hesitate to cross pavement or white line, down frontage road to north and winter pastures.



DATE OF PHOTO  
October 25, 1971

East Entrance



180" diameter x 200' long, C.M.P., Std. Drg. 59-06. Three miles north of Lima on 4-lane I-15. Herd movement of 400 head, west to east. Mixed Hereford and Angus cows, two-year olds, yearlings and some spring calves. Cattle did not hesitate to cross pavement or white line and trailed on down the frontage road to north and winter pastures.



Looking Northerly



South Entrance



210" diameter x 200' long, C.M.P., Std. Drg. 59-06. Three miles west of Columbus. Herd of 250 head - Black and Red Angus, Shorthorns and mixed heifers. There were snow flurries, temperature was about 20° above and cattle were moved across railroad tracks, old Highway #10 (still main traffic use) through gate to underpass in about 30 minutes of time.



Herd Trailing West to Pasture

DATE OF PHOTO  
August 27, 1971

South Entrance



210' diameter (17.5') x 200' long, C.M.P., Std. Drg. 59-06. Three miles west of Columbus, Hesston 300 swather measured 13'6" wide, road bed was 12' wide. This width and depth was just right for the equipment in use in this underpass.

DATE OF PHOTO  
August 27, 1971

South Entrance



210" diameter (17.5') x 200' long, C.M.P., Std. Drg. 59-06. Three miles west of Columbus. Hesston Stakhand 60 is 11'0" wide x 12'6" high x 30' long. Roadbed is 12' wide. Vehicle moved right through without problems. Roadbed elevation in pipe is at the right level.



DATE OF PHOTO  
August 27, 1971

South Entrance



210' diameter (17.5') x 200' long, C.M.P., Std. Drg. 59-06. Three miles west of Columbus. Hesston Stakhand 60 (11'0" wide x 12'6" high x 30' long) continues through with no problem. Roadbed elevation and width in pipe is just right for this equipment.

DATE OF PHOTO  
August 27, 1971

South Entrance



210" diameter (17.5') x 200' long, C.M.P., Std. Drg. 59-06. Three miles west of Columbus. Hesston Stakhand 60 (11'0" wide x 12'6" high x 30' long). Front view after going through underpass and returning. This underpass is considered to be of good utility for this ranching unit.

DATE OF PHOTO  
August 26, 1971

North Entrance



14'6" wide x 11' high x 120' long (actual measurement), reinforced concrete box culvert, Std. Drgs. 41-06, 41-07, 41-08. Location was about two miles east of Livingston. Hesston 500 swather measures 14' in width. Even though clearance was narrow, the driver traveled through at a normal speed. Slab top, dirt bottom in this structure which was located on 4-lane I-90.



DATE OF PHOTO  
August 26, 1971

North Entrance



14'6" wide x 11' high x 120' long (actual measurement), reinforced concrete box culvert, Std. Drgs. 41-06, 41-07, 41-08. Location was about two miles east of Livingston under 4-lane I-90. Hesston 500 swather (14' wide) travels on through structure without scraping sides.

DATE OF PHOTO  
August 26, 1971

North Entrance



14'6" wide x 11' high x 120' long, reinforced concrete box culvert, Std. Drgs. 41-06, 41-07, 41-08. Location was about two miles east of Livingston under 4-lane I-90. Side view is of John Deere 4320 Diesel with cab about 9' high.

DATE OF PHOTO  
August 26, 1971

North Entrance



14'6" wide x 11' high x 120' long, reinforced concrete box culvert, Std. Drgs. 41-06, 41-07, 41-08. Location was about two miles east of Livingston under 4-lane I-90. Rear view of John Deere 4320 Diesel with cab about 9' high and overall width of 8'.



DATE OF PHOTO  
August 26, 1971

North Entrance



14'6" wide x 11' high x 120' long, reinforced concrete box culvert, Std. Drgs. 41-06, 41-07, 41-08. Location was about two miles east of Livingston under 4-lane I-90. Front view of John Deere 4320 Diesel with cab about 9' high and overall width of 8'.

DATE OF PHOTO  
November 16, 1971

North End



20'7" x 13'2" x 210' long, squash C.M.P. One mile east of Ballantine under 4-lane I-94. Truck is 9' high x 8' wide. Erosion during periods of high runoff.



North End, Arrow Creek outlet

DATE OF PHOTO  
November 16, 1971

North End



20'7" x 13'2" x 210' long, squash C.M.P. One mile east of Ballantine under 4-lane I-94. Truck is 9' high to top of rack, and 8' wide.



North End - Looking south into Arrow Creek drainage



DATE OF PHOTO  
November 16, 1971

North End



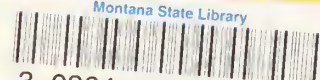
20'7''s x 13'2''r x 210' long, squash C.M.P. One mile east of Ballantine under 4-lane I-94. John Deere 4010 tractor and 12' wide Graham plow.



North end looking south



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